**What is claimed is:**

1. A method for forming a single-crystal silicon layer on a transparent substrate, comprising:

providing a transparent substrate having an amorphous silicon layer formed thereon and a silicon wafer having a hydrogen ion layer formed therein;

inverting and laminating the silicon wafer onto the amorphous silicon layer so that a layer of single-crystal silicon layer is between the hydrogen ion layer and the amorphous silicon layer; and

subjecting the laminated silicon wafer and the amorphous silicon layer to laser or infrared light to cause chemical bonding of the single-crystal silicon layer and the amorphous silicon layer and inducing a hydro-cracking reaction thereby separating the silicon wafer and the transparent substrate at the hydrogen ion layer, and leaving the single-crystal silicon layer on the transparent substrate.

2. The method as claimed in claim 1, further comprising subjecting the single-crystal silicon layer to high temperature annealing and chemical mechanical polishing thus reconstructing the silicon atoms to form a smooth surface.

3. The method as claimed in claim 1, wherein the transparent substrate is glass, quartz, synthetic quartz, $LiNbO_3$ or $LiTaO_3$.

4. The method as claimed in claim 1, wherein the laser energy is 50~400 $mJ/cm^2$.

5. The method as claimed in claim 1, wherein the wavelength of the infrared light is 0.7~1.5 $\mu$ m.

6. The method as claimed in claim 1, wherein the hydrogen ion layer is formed by doping with a dosage of $1x10^{16}$~$5x10^{17}$ $cm^{-2}$ and energy of 10~1000 keV.

7. The method as claimed in claim 1, wherein the depth of the hydrogen ion layer is 0.1~15 $\mu$ m from the surface of the silicon wafer.